Dr. Bruce J. West

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Dr. West is the Chief Scientist (ST) of Mathematical & Information Science, AMSRD-ARL-RO-M, 1999-present. His research focus has been on the development of the mathematical tools necessary to understand complex phenomena as they apply to the nascent discipline of Network Science. He has lead the development of a Nonlinear Science program at ARO starting in 2006. His work on the fractional calculus for the modeling of complex phenomena lead to *Physics of Fractal Operators* (with Bologna and Grigolini, Springer, 2003) for which he received the Army Research Laboratory Award for Publication in 2003. As exemplars of complex networks he has pursued research in physiology and the modeling of nonlinear biomedical phenomena leading to the text *Biodynamics: Why the Wirewalker Doesn't Fall* (with L. Griffin, Wiley & Sons, 2004). His research has provided new measures for the detection and assessment of injury, disease and other physiologic pathologies of significance to the soldier. These measures include the assessment of the level of injury in head trauma, the detection of abnormalities in the cardiovascular network and in the motor control network for human locomotion, the detection of micro-seizures during sleep and quantitative indicators of a soldier's general state of health. These measures are laid out in a pedagogic manner in the popular book *Where Medicine Went Wrong* (World Scientific, 2006). Dr. West has over 350 publication and in excess of 6,000 citations to his research.

Before coming to ARO Dr. West was Professor of Physics, University of North Texas, 1989-1999; Chair of the Department of Physics 1989-1993; and Founding Director of the Center for Nonlinear Science 1994-1999. During his time at the university he did research into the quantum manifestations of chaos (energy level repulsion, ionization rate enhancement, breakdown of the Correspondence Principle); the foundations of statistical mechanics (getting random fluctuations without statistics, failure of the Green-Kubo relation, Lévy statistics); nonlinear processing techniques applied to biomedical phenomena. He received the Decker Scholar Award (1993) and the UNT President's Award for research (1994).

Prior to becoming a university professor Dr. West was Director, Division of Applied Nonlinear Science, La Jolla Institute, 1983-1989. During this period he worked on the development of nonlinear dynamical models of biomedical phenomena, physical oceanography and the statistical mechanical foundations of thermodynamics. Specifically he helped develop ways to use renormalization group concepts to extract pattern information from biomedical time series.

Dr. West was Associate Director, Center for the Studies of Nonlinear Dynamics, La Jolla Institute, 1979-1983. He applied some of the newly emerging concepts in nonlinear dynamics systems theory to nonlinear water wave fields and turbulence. He also examined how the branching structure of the lung and other physiological structures could be described by scaling. He graduated with a Ph. D. in Physics from the University of Rochester in 1970, after which he did two years as a post doctoral researcher before becoming the first full time employee of a small private company Physical Dynamics Inc. In 1976 he and some senior scientists became the founding members of the La Jolla Institute, where he remained in various positions until joining the university in 1989.